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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,475	09/01/2006	Mitsuo Takashima	295882US0X PCT	1462

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EXAMINER	
SHEVIN, MARK L	

ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
12/08/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,475	TAKASHIMA ET AL.	
	Examiner	Art Unit	
	MARK L. SHEVIN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement of RCE

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 15th, 2009 has been entered.

Status of Claims

2. Claims 1-18, filed September 15th, are pending. Claims 1, 14, and 15 have been amended.

Status of Previous Rejections

3. The previous rejections of claims 1-18 under 35 U.S.C. 103(a) over **Ibaraki** (JP 2000-337333 – Full human translation) in view of **Koike** (US 2002/0179207) in the Office action dated June 16th, 2008 have been withdrawn in view of the amendments to claims 1 and 15.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

4. **Claims 1-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namimura** (JP 2000-337334 – Machine translation) in view of any one of **Koike** (US

2002/0179207 A1), **Hijikata** (JP 59-226116 – Derwent abstract and oral translation of cited portion), or **Stefayne** (US 3,677,829).

Namimura

Namimura, drawn (Abstract) to a high-strength bolt with excellent resistance to delayed fracture and a tensile strength of over 1200 N/mm^2, features a microstructure of more than 80 area% pearlite with the remainder being proeutectoid ferrite, free cementite, bainite, and martensite at less than 20 area% (para 0012).

The contents of C (para 0016), Si (para 0018), Mn (para 0021), P (para 0029), S (para 0030), Al (para 0025), Cr (para 0020), Co (para 0019), Ni (para 0023), Cu (para 0022), Mo+V+Nb+Ti+W (para 0024), B (para 0026), and Fe (para 0028) are shown in the comparative table below:

Elements	Namimura	Instant Claims 1,15	Overlap
C	0.5 – 1.0	0.5 – 1	0.5 – 1
Si	(0) – 2.0	0.7 – 3	0.7 – 2.0
Mn	0.2 – 1.0	0.2 – 2	0.2 – 1.0
P	(0) – 0.03	(0) – 0.03	(0) – 0.03
S	(0) – 0.03	(0) – 0.03	(0) – 0.03
Al	0.01 – 0.05	(0) – 0.03	0.01 – 0.03
Cr	(0) – 1.0	0.51 – 2.5	0.51 – 1.0
Co	(0) – 0.5	(0) – 0.5	(0) – 0.5
Ni	(0) – 1.0	(0) – 1.0	(0) – 1.0
Cu	(0) – 0.5	(0) – 1.0	(0) – 0.5

Mo, V, Nb, Ti, W	Total: 0.01 – 0.5	Total: (0) – 0.50	Total: 0.01 – 0.5
B	0.0005 – 0.003	(0) – 0.003	0.0005 – 0.003
Fe	Balance	Balance	Balance

The bolt is formed by wire drawing, cutting to a predetermined length, warm-forging the head, and rolling the threads (para 0006-0007). Warm forging is used instead of cold forging because it is more difficult to form the bolt head by cold forging due to the very high strength of the wire rod (para 0040).

Namimura does not teach subjecting the bolt to a bluing treating in a temperature range of 100 to 500°C.

Koike:

Koike, like Namimura, is drawn to a high-strength bolt having excellent delayed fracture resistance and stress relaxation resistance with a tensile strength of over 1200 N/mm^2 (Abstract), teaches producing a steel wire of the composition listed in the table below, with a total areal rate of pro-eutectoid ferrite, pro-eutectoid cementite, bainite, and martensite of less than 20% with the remainder as pearlite (para 0008).

Elements	Koike	Namimura	Overlap
C	0.5 - 1	0.5 – 1.0	0.5 – 1.0
Si	0 < 0.5	(0) – 2.0	(0) – 0.5
Mn	0.2 – 1.0	0.2 – 1.0	0.2 – 1.0
P	0 < 0.03	(0) – 0.03	(0) – 0.03
S	0 < 0.03	(0) – 0.03	(0) – 0.03

Al	0.01 – 0.05	0.01 – 0.05	0.01 – 0.05
Cr	0 - 0.5	(0) – 1.0	0 – 0.5
Co	0 < 0.5	(0) – 0.5	0 – 0.5
Ni	0 < 1.0	(0) – 1.0	0 – 1.0
Cu	0 < 0.5	(0) – 0.5	0 – 0.5
Mo, V, Nb, Ti, W	0 - 0.3	Total: 0.01 – 0.5	0.01 – 0.3
B	Not stated	0.0005 – 0.003	n/a
Fe	Balance	Balance	Balance

The steel wire is formed into a bolt by wire-drawing the steel (para 0015), cold heading the wire into a bolt shape (para 0021) and then bluing in the range of 100 – 400 °C to increase the bolt strength and improve the proof stress ratio and relaxation resistance (para 0020).

Koike does not teach the content of silicon in the claimed range of 0.55 – 3 wt% but does teach that the beneficial effects of Si (improving hardenability, deoxidation, and solid-solution strengthening) all improve with increasing Si content, but at the expense of ductility (para 0026). Koike and Namimura teach Si as a valuable element in terms of increasing mechanical properties but differ only what they consider as the maximum level acceptable for ductility purposes.

Hijikata:

Hijikata, like Namimura, is drawn to a high tension bolt (tensile strength above approximately 1275 N/mm^2 and thus within the range of Namimura) with resistance to

delayed fracture (Title), discloses a bolt made from a low-alloy steel rod of C: 0.3 – 0.6 wt% and more than 1.2 wt% of Si as essential components that is blueing-treated (Abstract) at 300 – 350 °C (p. 4, col. 2, para 4).

Stefayne:

Stefayne, drawn to a process for the bluing of steel surfaces, teaches that steel surfaces are blued to form a blue-colored oxide surface and to impart corrosion resistance (col. 1, lines 25-37). Bluing is performed between 305 and 360 °C (col. 2, lines 35-45). Claim 1 discloses forming colored oxides on steel surfaces by allowing the part to be blued to come in contact with the hot vapors. The part to be blued is in thermal equilibrium with the reflux vapors and is thus in the temperature range of 305 and 360 °C (col. 4, lines 70-75).

Regarding claims 1 and 15, Namimura discloses a high-strength bolt with a tensile strength in the claimed range, excellent resistance to delayed fracture resistance, having a base steel composition overlapping each and every claimed range of C, Si, Mn, P, S, Al, Cr, Co, Ni, Cu, Mo, V, Nb, Ti, W, and Fe, and having a microstructure with greater than 80 area% pearlite and remainder (< 20 area% pro-eutectoid ferrite, free cementite, bainite, and martensite).

It would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to subject Namimura's bolt to a bluing treatment in the claimed range of 100 – 500°C as Koike taught that bluing in the overlapping range of 100 - 400 °C increases the strength, proof stress ratio, and relaxation resistance of the bolt (para 0020).

Alternatively, it would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to subject Namimura's bolt to a bluing treatment in the claimed range of 100 – 500°C as Hijikata taught that bluing treatment at 300 – 350 °C is applied as the last step in the production of a substantially similar high-strength bolt with a tensile strength of greater than 1200 N/mm^2 (Abstract and p. 4, col. 2, para 4).

Again, alternatively, it would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to subject Namimura's bolt to a bluing treatment in the claimed range of 100 – 500°C as Stefayne taught that bluing imparts corrosion resistance (col. 1, lines 25-37) and a blue-colored oxide film and that the process may be performed with vapors at between 305 – 360 °C, thus overlapping the claimed temperature range

It would have been obvious to one of ordinary skill in high-strength bolt production, at the time of the invention, to select any portion of the claimed ranges of alloying composition, microstructure area percentages, and bluing temperature, including the claimed ranges, from the overlapping ranges disclosed in Namimura 9all but bluing temperature), Koike (bluing temperature), Hijakata (bluing temperature), and Stefayne (bluing temperature) because these references find that the prior art bolts in the entire disclosed ranges have a suitable utility and the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). From

MPEP § 2144.05: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

With respect to the bolt being "…prepared by: wire-drawing,…cold heading", although Namimura does not specifically teach that his bolt was formed by cold heading, determination of patentability is based on the product itself and does not depend on its method of production unless the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

Cold-heading does not impart any additional structure to the claims beyond the alloy composition and microstructure already present and thus the prior art of Namimura does not teach away from the claimed product and instead reads on the claimed product as explained above.

Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi,* 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)

With respect to the amendment to claims 1 and 15 narrowing the Si content to 0.70 to 3 wt%, Namimura overlaps the claimed range as shown in the comparative table at p. 3-4 above.

With respect to the amendment to claims 1 and 15 adding that the bluing treatment is done"...to form a solid solution of Si in the ferrite", one of ordinary skill in the art would have reasonably expected the final product of the high-strength bolt to have a solid solution of Si in the ferrite as Namimura taught that Si dissolves in ferrite, thereby demonstrating remarkable solid-solution strengthening (para 0018).

Regarding claims 2-14 and 16-18, Namimura teaches steel compositions with alloying additions of Co, Ni, Cu, Mo, V, Nb, Ti, W, B, and Fe that fall in the instantly claimed ranges as shown in the comparative table above. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch and MPEP 2144.05, above.

With respect to the amendments to claim 14, as discussed above, Namimura still has an overlapping Cr content.

With respect to claim 13, Koike and Hijikata teach bluing at temperatures overlapping those of the instantly claimed range of 200 – 300 °C, while Stefayne teaches a temperature range of 305 – 360 °C, it is not clear how the instant claims have

any different result as a result of the lower bluing temperature, as the patentability of the claims is based on the end product and it's structure, not the method of manufacturing.

Response to Applicant's Arguments:

5. Applicant's arguments filed September 15th, 2009 have been fully considered but they are not persuasive.

Applicants' assertions with respect to Ibaraki (p. 6, para 3 to p. 7, para 2 and p. 8, para 2) are moot in view of the withdrawal of the rejections over Ibaraki.

Applicants assert (p. 7, para 3) that Koike teaches away from cold heading when Si content is greater than 0.5 wt%

In response, with respect to the bolt being "...prepared by: wire-drawing,...cold heading", although Namimura does not specifically teach that his bolt was formed by cold heading, determination of patentability is based on the product itself and does not depend on its method of production unless the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

Cold-heading does not impart any additional structure to the claims beyond the alloy composition and microstructure already present and thus the prior art of Namimura does not teach away from the claimed product and instead reads on the claimed

product as explained above. Thus applicants have not shown how Koike would teach away from the presently claimed product in this regard.

Applicants assert (p. 7, para 4) that Koike teaches that the area ratio of pearlite should be preferably 100%, thus meaning that ferrite preferably does not exist so that a solid solution of Si in the ferrite is not formed.

In response, MPEP 2123 teaches that "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). Furthermore, "A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments." *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied,* 493 U.S. 975 (1989).

In this case, Koike discloses that proeutectoid ferrite, proeutectoid cementite, bainite, and martensite are less than 20 areal% of the microstructure with pearlite being the balance (thus 80 areal% and higher), which overlaps the claimed microstructure and in no way teaches away from having Si dissolved in ferrite.

Applicants assert (p. 8, para 1) that Koike teaches that from steel containing more than 0.5 wt% Cr.

In response, from MPEP 2143.01, Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest

solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. *In re Young*, 927 F.2d 588, 18 USPQ2d 1089 (Fed. Cir. 1991).

Namimura is used as the primary reference and has an overlapping range of Cr, preferably less than 0.5 wt% (para 0020), but differs from Koike in that it considers 1.0 wt% to be the maximum allowable content instead of 0.5 wt% as Koike does. Namimura and Koike are substantially similar invention in teaching high-strength bolts of substantially similar composition (see second comparative table on p. 4-5) and microstructure. Weighing the suggestive power of Namimura against Koike, Namimura is more suggestive in that it discloses a broader range of Cr and Si compared to Koike while Koike does not even have a coherent teaching away of a negative result upon addition of "too much" Cr. Koike only teaches that bolt strength increase upon addition of Cr and Co "cannot be improved any further" (para 0035).

Applicants assert (p. 8, para 2) that Koike cannot be properly applied with prior art teaching warm forging because Koike is limited to cold forging.

In response, this line of argument is not persuasive for the same reasons as explained above for the assertions at p. 7, para 3 of Applicant's remarks.

Conclusion

-- Claims 1-18 are rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

December 1st, 2009
10-591,475

/George Wyszomierski/
Primary Examiner
Art Unit 1793